

Public Health Principles of **Diabetes Prevention** in **High Risk Persons**

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Brief History of Diabetes Prevention

“The physician should take pride in the prevention of diabetes in his practice... The physician should consider it as important to prevent his patients acquiring diabetes as he feels it incumbent on himself to vaccinate them against small pox or typhoid fever, or to protect them from exposure to tuberculosis.”

Joslin EP. The prevention of diabetes mellitus. JAMA. **1921**;76:79–84.

Insulin was discovered in 1921.

Brief History of Diabetes Prevention:

Clinical Trials in High Risk* “Persons”

- 1979 (UK), 1980 (Sweden), 1982 (UK) > *All negative*
- **1993: Prevention of Diabetes in Monkeys (US)**
 - 19 fed diet but unlimited amount.
 - 8 fed diet but amount limited to stabilize body weight.
 - After 9 years:
 - 4 out of 19 on unlimited diet developed diabetes
 - 0 on limited diet developed diabetes

(Hansen and Bodkin. Diabetes 1993;42:1809-1814.)
- **1997: Da Qing Study (China)**
 - Lifestyle program reduced new cases of diabetes by 40%
- **2001: Finnish Diabetes Study (Finland)**
 - Lifestyle program reduced new cases of diabetes by 58%
- **2002: Diabetes Prevention Program (US)**
 - Lifestyle program reduced new cases of diabetes by 58%

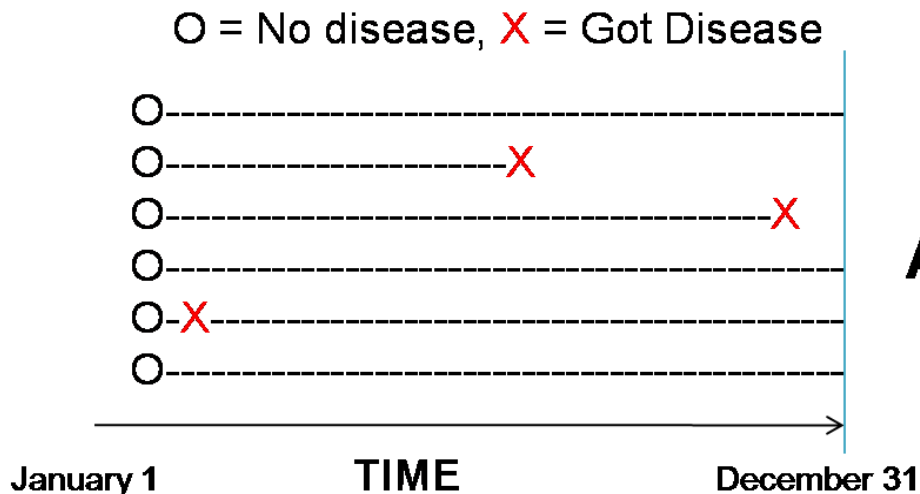
*** All human studies limited to people with pre-diabetes.**

Principle I:

Diabetes **Risk** Must Match Program Cost

- Risk – what is it?

The chances of developing a disease over a specified time period.



$$\text{Annual Risk} = 3/6 = 50\%$$

What Are Our Chances of Developing Diabetes?

- **Lifetime Risk** – from birth till death

- About 1-in-3 or **33%**

(Narayan KMV, et al. JAMA 2003;290:1884-1890.)

- **Annual Risk** – adults

- About **1%**

(Bonora E, et al. Diabetes 2004;53:1782–1789.)

(Maskarinec G, et al. Diabetes 2009;online March 3, 2009.)

Groups at “high risk” for diabetes (a.k.a. “pre-diabetes”)

- Impaired Fasting Glucose (IFG)
100 mg/dl - 125 mg/dl
Annual risk about 3%
- Impaired Glucose Tolerance (IGT)
Post-load glucose 140 mg/dl - 199 mg/dl
Annual risk about 3%
- Both IFG and IGT
Annual risk about 4%
- High Risk A1C
5.7% - 6.4%
Annual risk about 3%

What's my annual risk if my glucose levels are normal?

$\approx 0.3\%$

(Engberg S, et al. Progression to impaired glucose regulation and diabetes in the population-based inter99 study. *Diabetes Care*. 2009;32(4):606–611.)

- *Only one-tenth that of pre-diabetes*

Why is being “high risk” so important for the effectiveness of diabetes prevention?

The biologic and economic impact of the DPP lifestyle intervention apply only to persons at high risk of developing type 2 diabetes, i.e. persons with “pre-diabetes.”

Persons with normal glucose levels are much less likely to experience substantial increases in near-term health care costs due to the development of diabetes.

- There is less chance of saving money with diabetes prevention programs in persons with normal glucose levels.
- Even the translated DPP lifestyle intervention is resource-intensive and investment of scarce health care resources in persons with normal glucose levels is unlikely to significantly reduce their future health care costs.

However, some persons with normal glucose levels will eventually develop pre-diabetes and then go on to diabetes.

- However, we do not have ways to reliably identify these persons.

Therefore, the ADA recommends that adults with normal glucose levels have their blood re-tested for pre-diabetes every few years.

- If they develop pre-diabetes then they can be linked to a prevention program.

Principal I:

Diabetes Risk Must Match Program **COST**

Risk Group	Percent of People	Annual Risk (%)	Annual Number of New Cases	Percent of All New Cases	If Program was 100% Effective: Number Needed to Treat To Prevent 1 New Case	
Total Pop	100	1.0	2,070,681	100	100	Most Equitable
Obese	40	1.7	1,477,769	71	59	
Highest of High Risk: People with IFG & IGT	8	3.9	638,983	31	26	Most Efficient
Moderate Risk: People with IFG, IGT, or A1C	24	2.9	1,406,662	68	35	Most Equitable and Efficient

ADA Recommendations for Identifying Persons with Pre-diabetes

•Testing should be considered in all adults who are overweight (BMI \geq 25) and have *additional risk factors*:

1. Physical inactivity
2. First-degree relative with diabetes
3. Members of a high-risk ethnic population (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
4. Women who delivered a baby weighing >9 lb or were diagnosed with GDM
5. Hypertension (\geq 140/90 mmHg or on meds)
6. HDL cholesterol level <35 mg/dl and/or triglyceride level >250 mg/dl
7. Women with polycystic ovary syndrome
8. Other clinical conditions associated with insulin resistance (acanthosis nigricans)
9. History of CVD
10. A1C \geq 5.7%, IGT, or IFG on previous testing

•If none of the above, begin blood screening at age 45.

•If results are normal, repeat screening at least every 3 years.

ADA. Standards of Medical Care in Diabetes - 2010. Diabetes Care, January 2010;33 (Suppl. 1): S13 (Table 4).

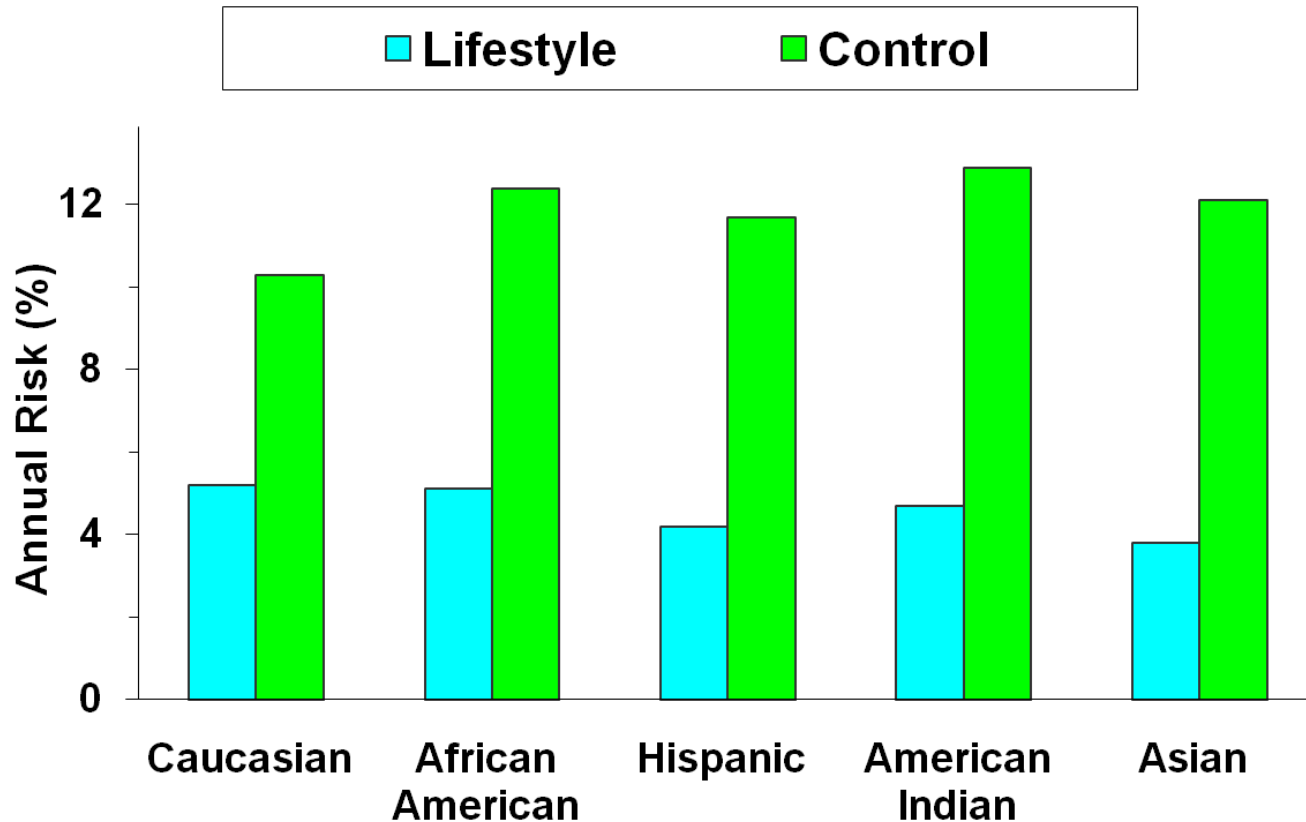
Principal II:

Program Must Be **Effective**

Effect of Lifestyle Program on the Risk of Getting Diabetes in the DPP

	<u>Control</u>	<u>Lifestyle</u>
Annual Risk of diabetes	11.0%	4.8%
<i>Absolute</i> Risk Reduction		- 6.2 ppts.
<i>Relative</i> Risk Reduction	----	-58%

The DPP Lifestyle Program Was Effective in Everybody



How Many Lifestyle Sessions is Best?

First author	N	Age	Men (%)	BMI	Sessions offered	Sessions attended	Wt loss (%)	Wt loss (lbs)	7% loss (%)	5% loss (%)
					(wks)					
DPP	1079	51	32	34	16 (24)	15	7	14.3	50	nr
Amundson	295	54	20	36	16 (16)	14	6.7	14.7	45	67
Ackermann	46	57	50	32	16 (20)	9	6	12.1	36	59
Pagoto	118	49	28	43	16 (16)	13	4.6	12.3	30	49
Boltri	8	-	-	32	16 (24)	10	3.6	7.5	-	-
Aldana	35	-	34	32	16 (24)	11	3.3	6.4	-	-
Wolf	73	53	38	38	12 (52)	7	4.9	5.3	-	20
McBride	40	52	41	37	12 (12)	-	4.6	11.0	-	-
Kramer	93	55	19	36	12 (14)	8	3.5	7.5	24	52
McTigue	72	53	16	39	12 (52)	-	-	11.4	27	-
Seidel	88	54	16	nr	12 (14)	9	-	-	26	46
Davis-Smith	10	-	30	36	6 (6)	5	3.8	8.8	-	-
Cramer	27	-	-	-	7 (28)	-	2.7	5.5	-	-
Whittemore	31	48	10	40	11 (36)	8	-	-	-	25

Principal III:

Program Must Be Economically Sustainable

DPP Lifestyle Program Summary of Benefits:

Treating 100 high risk adults (age 50) for 3 years...

- **Prevents 15 new cases of Type 2 Diabetes¹**
- **Prevents 162 missed work days²**
- **Avoids the need for BP/Chol pills in 11 people³**
- **Avoids \$91,400 in healthcare costs⁴**

¹ DPP Research Group. N Engl J Med. 2002 Feb 7;346(6):393-403

² DPP Research Group. Diabetes Care. 2003 Sep;26(9):2693-4

³ Ratner, et al. 2005 Diabetes Care 28 (4), pp. 888-894

⁴ Ackermann, et al. 2008 Am J Prev Med 35 (4), pp. 357-363; estimates scaled to 2008 \$US

Principal III:

Program Must Be **Economically Sustainable**

Q. How much should the lifestyle intervention cost in order to save money?

Direct Healthcare Costs For Persons with Pre-Diabetes :				
Age	Year	Usual Care	If they get the DPP	Costs avoided each year
50	1	\$2,496	\$2,228	\$268
51	2	\$2,514	\$2,217	\$297
52	3	\$2,556	\$2,207	\$349
53	4	\$2,546	\$2,254	\$292
54	5	\$2,567	\$2,235	\$332

A. About \$300 per year.



Principal IV: Program Must Be **Available**

2,686 YMCAs

**57% of U.S. households are
located within 3 miles of a
YMCA**



No public health impact without availability to high risk population.

A Vision



“Ms. Jones, your blood sugar test came back and its 112 which is a bit high.

You don’t have diabetes, but you do have a condition we call pre-diabetes. You have about 1 chance in 3 of developing diabetes within the next 5 years.

But, there’s good news.

We now know that losing only 5-10% of your body weight and walking on most days for just a half-hour can cut your chances of getting diabetes in half.

In fact, we have an arrangement with your local ‘Y’ which has a very good lifestyle program that meets weekly for 16 weeks. It has been really effective for many of my patients with pre-diabetes.

Even better, your health insurance is willing to pay the cost of the Y program.

Here’s your lifestyle prescription that you give to the folks at the Y when you sign up for the lifestyle program.

Also, I’ll want to see you again to check your blood sugar in about 6 months.”

CDC's Approach to Realizing this Vision

CDC 's National System for Recognizing Diabetes Prevention Programs

- To provide patients, health care providers, and health payers trustworthy information on the availability of high quality diabetes prevention programs in their community.
- To attract health payer funding to support the long-term sustainability of diabetes prevention programs in the U.S. population.
 - Required Program Standards
 - Required Program Outcomes
 - Annual Assessment for Re-recognition
 - National Registry of Recognized Programs

Y the Y ?

"If you look at health reform as a three-legged stool addressing **access**, **cost** and **quality**, all three things have to be addressed."

Mark Bertolini, president of Aetna

"Insurers: Brace for fast and furious costs."

CNNMoney.com

April 23, 2010



YMCA's Diabetes Prevention Program

YMCA of Greater Seattle Sites

2010

What is YDPP?

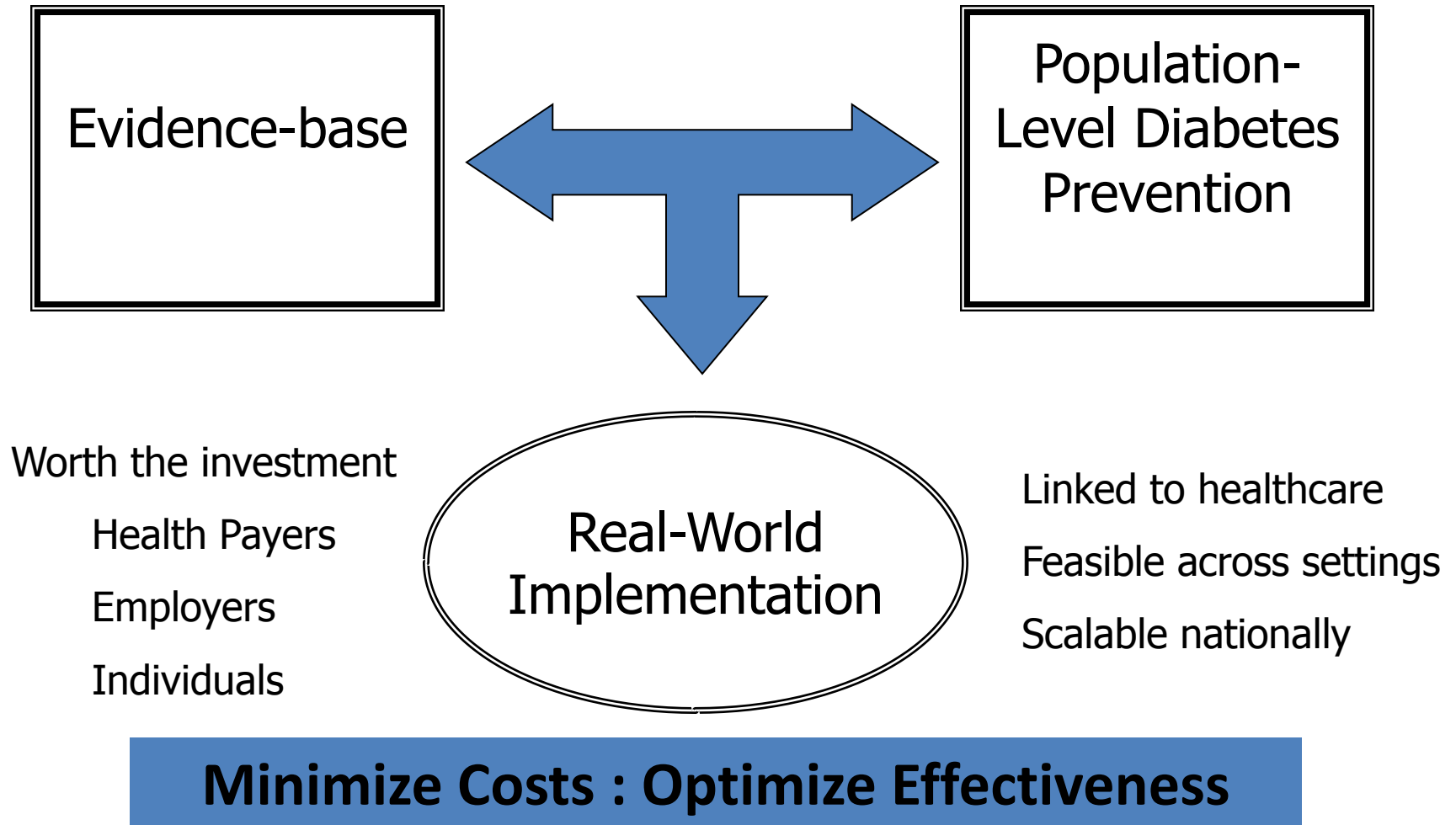
- Evidence-based program
- Developed to reduce the risk of diabetes in individuals with pre-diabetes or at high risk for developing type 2 diabetes
- Group –based program delivered by YMCA Lifestyle Coach
- 16 weekly one-hour core sessions, with monthly follow-up for up to a year

Lifestyle Intervention

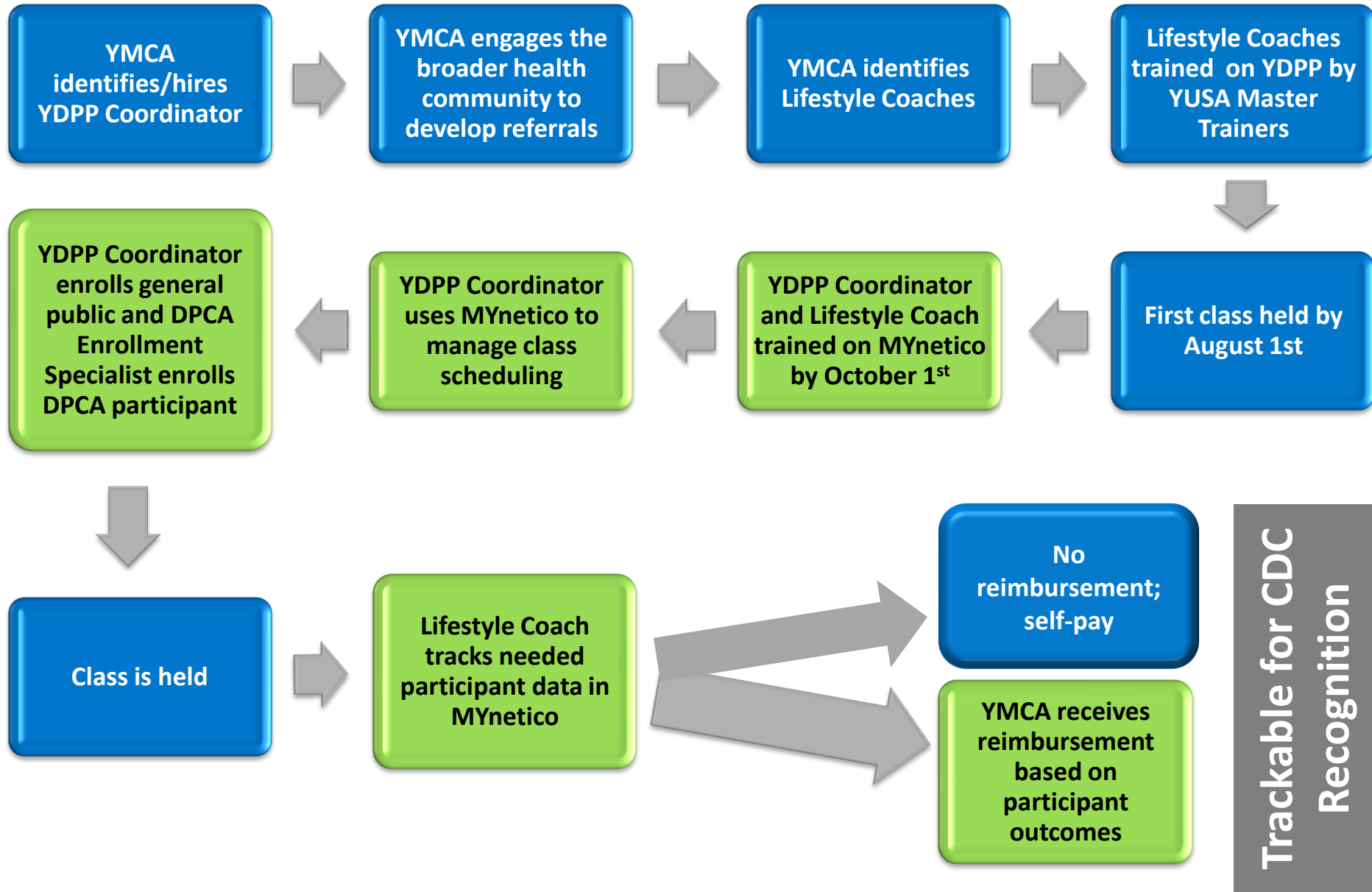
An intensive program with the following specific goals:

- **$\geq 7\%$ loss of body weight and maintenance of weight loss**
 - **Fat gram goal -- 25% of calories from fat**
 - **Calorie intake goal -- 1200-1800 kcal/day**
- **≥ 150 minutes per week of physical activity**

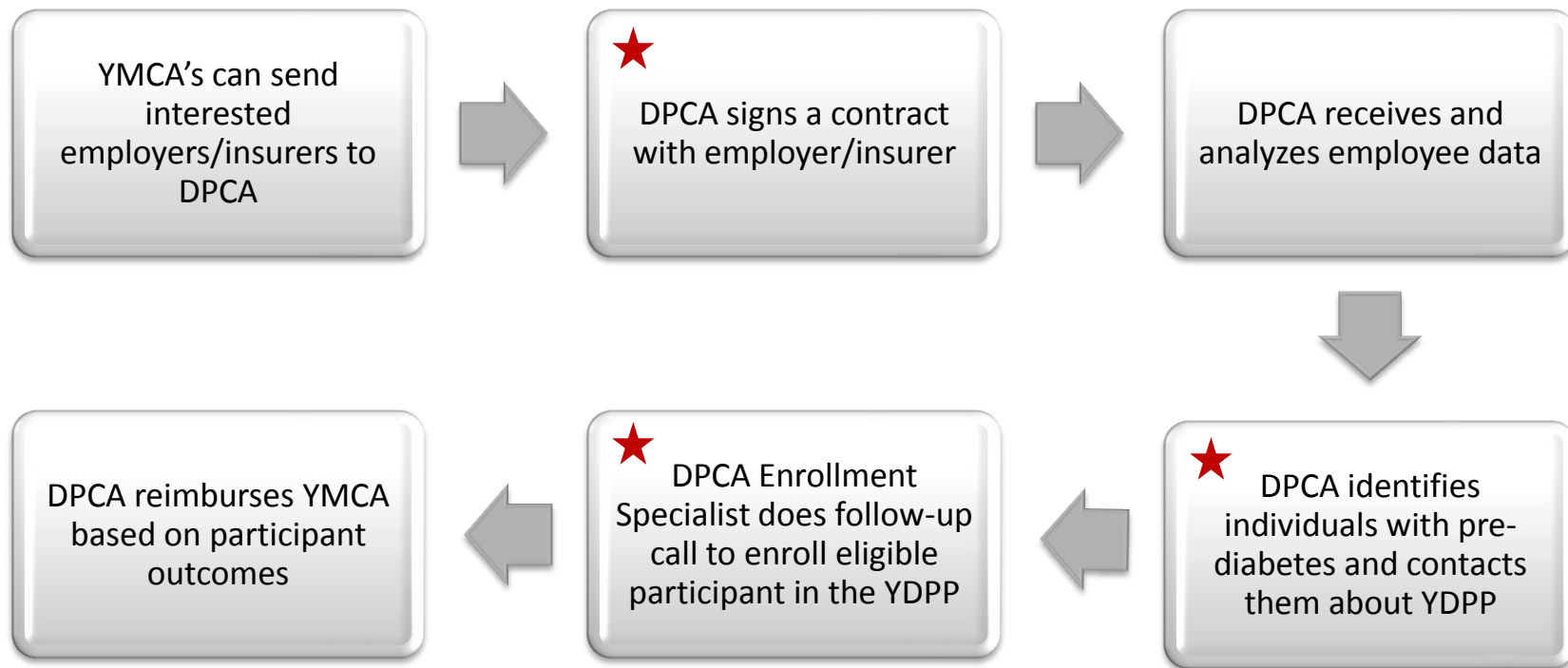
YDPP –into the Community



What will be different?



Going Deeper on DPCA's Role



★ Key communication point with YMCA

Next Steps

Washington State Sites

**YMCAs Offer YDPP-not
yet eligible for
reimbursement:**

**Auburn
Gig Harbor
Tacoma
Wenatchee**

October 2010 CDC Conversion Sites

YMCAs eligible for reimbursement:

**South Region - Auburn
East Region - Bothell
North Region - Shoreline
West/Central Region - West Seattle**

Seattle YDPP Sites

- Auburn YMCA – June program session will meet Aug 1st start date requirement for CDC eligibility
- 3 additional branches – October Launch
 - Northshore YMCA in Bothell
 - Dale Turner YMCA in Shoreline
 - West Seattle & Fauntleroy YMCA in West Seattle
- Additional branches added in 2011 based on readiness
- Additional YDPP sites (Tacoma, Wenatchee, Spokane) will need to work through an RFP process with YUSA to become a CDC recognized site

Seattle YDPP Financial Model

- Two YMCAs in Washington State have instituted a voluntary 3-tier fee program. Our goal is to serve all community income levels. Participants may choose the tier that is most suitable for them (Auburn and Spokane)
- YMCA Facility Members: Tier I \$25/ Tier II \$60/ Tier III \$90
- Community Participants: Tier I \$45/ Tier II \$105/ Tier III \$165

Building Community Support and Generating Referrals

- WA State DOH Diabetes Network
 - Local coalition members
 - Physician YDPP Prescription Pad
 - Screening and Referral plan
 - UnitedHealth Group Diabetes Prevention and Control Alliance (DPCA), and insurers who connect with them
- YMCA Marketing & Communications Team
 - YMCA internal promotion
 - Possible interaction with Fischer Communications for fall diabetes promotion

YMCA contacts:

- YMCA of the USA DPP contact
 - Valerie Lawson, valerie.lawson@ymca.net
- YMCA of Greater Seattle DPP Leadership
 - Linna Dossett, ldossett@seattleyymca.org
 - Wendy Bart, ldossett@seattleyymca.org
- YMCA of Greater Seattle DPP Coordinator
 - Lindsey Gregerson, lgregerson@seattleyymca.org
- YMCA of Greater Seattle State-wide DPP Spread Coordinator
 - Katie Koblenz, kkoblenz@seattleyymca.org

Tools For Providers



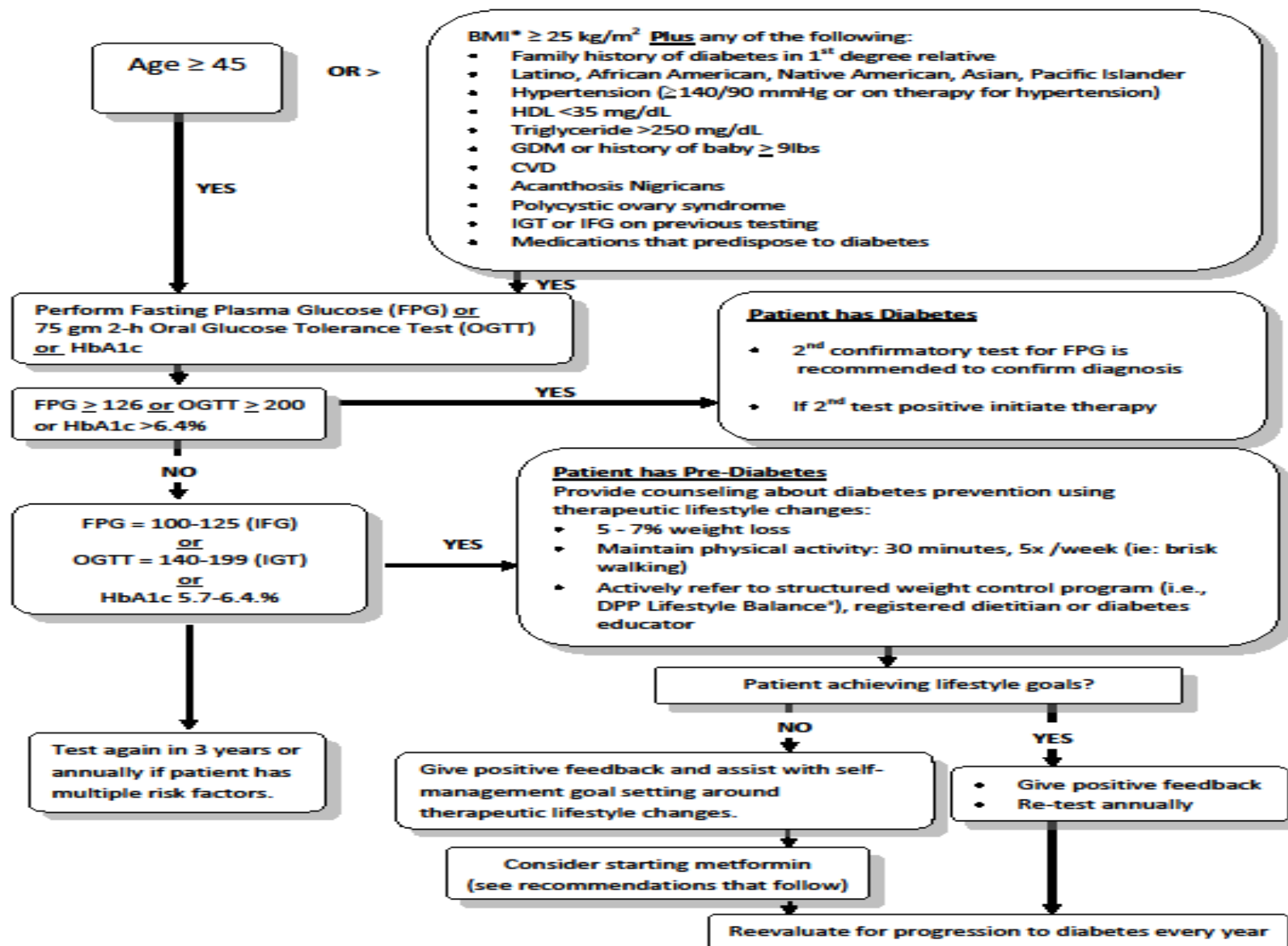
Healthy Communities
Washington

Healthy people in healthy places



PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND
HEALTHIER WASHINGTON

ALGORITHM: Pre-Diabetes Identification and Intervention



Common ICD-9 Codes for Diabetes Screening

V77.1	Diabetes Screening
790.21	Impaired Fasting Glucose
790.22	Impaired Glucose Tolerance
278.00	Obesity
278.02	Overweight

CPT Codes for Diabetes Screening

CPT 82947	Fasting Plasma Glucose Test
CPT 82950	Post-meal Glucose
CPT 82951	Oral Glucose Tolerance Test

Prescription Pad for Patient Referral



I have diagnosed _____
(Name of Patient)

with pre-diabetes based on the following criteria:

- ☐ A1C 5.7—6.4%
- ☐ Impaired Glucose Tolerance 140—199 mg/dl
- ☐ Impaired Fasting Glucose 100—125 mg/dl

I am referring this patient to a diabetes prevention program.

Print Name

Signature

Medical Facility

Date

Front

Prescription Pad

YMCA Contact Information

Diabetes Prevention Program in Washington

The YMCA offers a 16-week program for people with pre-diabetes. This program decreases your risk of diabetes by promoting healthy weight management, increasing activity and improving nutrition in a friendly group environment.

Please contact the Health and Wellness Director at the YMCA near you for more information about the Diabetes Prevention Program.

Seattle YMCA Locations

Lindsey Gregerson

(206) 344-3181

lgregerson@seattleyymca.org



Wenatchee Valley YMCA

217 Orondo

Wenatchee, WA 98801

(509) 662-2109

www.wenymca.org

Gig Harbor YMCA

10550 Harbor Hill Drive

Gig Harbor, WA 98332

(253) 853-9622

www.ymcatacoma.org

DOH 345-272
June 2010

YMCA of the Inland Northwest

930 N. Monroe

Spokane, WA 99201

(509) 777-YMCA (9622)

www.ymcaspokane.org

Back

Prescription Pad

Refill Information

Need Refills?

Diabetes Prevention & Control Program
Washington State
Department of Health
360-236-3519

Publication:
DOH 345-272 June 2010

Questions?